Claim Amendments

1. (currently amended) A method for use in a stored program controlled system comprising a plurality of processing units and a central hub for interconnecting processing units using space division multiplexing over ~~a~~ free space optical beam lines, said method including the steps of:

generating ~~a~~ collimated beamlines at respective ones of said plurality of processing units for ~~a~~ destination processing units comprising ~~another~~ ones of said plurality of processing units;

modulating ~~a~~ messages on said collimated beamlines;

transmitting each of said beamlines through an assigned volume within a conduit that encloses ~~of~~ said free space beamlines and said hub;

receiving at least one of said beam lines at said hub while permitting at least one other of said beam lines to pass through said hub on its way to another destination within the conduit beyond said hub; and

demodulating said at least one beam line to recover said message.

2. (currently amended) A method for use in a stored program controlled system comprising a plurality of processing units and a central hub for interconnecting processing units using space division multiplexing over a free space optical beam line, said method including the steps of:

generating a collimated beamline at one of said plurality of processing units for a destination processing unit comprising another one of said plurality of processing units;

modulating a message on said collimated beamline;

transmitting said beam through a volume of said free space beamline where the beamline is

enclosed within a conduit;
receiving said beam at said hub;

demodulating said beam to recover said message; and

~~A method in accordance with claim 1 further including the step of~~ arranging said volumes in a helix around the circumference of said beamline and around the centerline within the conduit.

3. (original) A method in accordance with claim 1 further including the step of arranging said hub comprises arranging a plurality of transmit probes and a plurality of receive probes in an array.

4. (original) A method in accordance with claim 1 further including the step of routing said messages at said hub.

5. (original) A method in accordance with claim 1 further including a receive probe at a selected processing unit, said method further including the steps of:
modulating a message on said collimated beamline at said hub;
transmitting said beam through a reserved volume of said free space beamline;
receiving said beam at said selected processing unit and
demodulating said beam to recover said message.

6. (currently amended) A method for use in a stored program controlled system comprising a plurality of processing units and a central hub for interconnecting processing units using space division multiplexing over a free space optical beam line, said method including the steps of:

generating a collimated beamline at one of said plurality of processing units for a destination processing unit comprising another one of said plurality of processing units;

modulating a message on said collimated beamline;

transmitting said beam through a volume of said free space beamline that is contained within a conduit;

receiving said beam at said hub that is contained within the conduit;

demodulating said beam to recover said message;

~~A method in accordance with claim 1 wherein each of said processing units includes a movable probe ring, said method further including the step of~~ arranging said transmit and receive probes of a processing unit on a~~said~~ movable probe ring contained on each of said processing units; and

rotating the movable probe ring within a plane substantially perpendicular to beamline and a centerline of the conduit.

7. (currently amended) A method in accordance with claim 6~~5~~ wherein said processing units include an actuator connected to said movable probe ring, said method further including the step of aligning said probes with corresponding beams by rotating the ring by said actuator ~~to provide control over beam alignment~~.

8. (currently amended) An apparatus for use in a stored program controlled system comprising a plurality of processing units for interconnecting processing units to provide space division multiplexing over a free space optical beam line, said apparatus comprising:

a transmit probe configured to modulate a message on a first collimated beamline and to transmit said first beam through a volume of said free space beamline;

a receive probe configured to receive a second~~said~~ collimated beamline in said volume of said free space beamline and to demodulate said second collimated beamline to recover said message;

a hub that receives the beamline transmitted by the transmit probe and transmits the beamline received by the receive probe;

a conduit that encloses the beamlines, hub, and transmit and receiver probes, the hub disposed within the conduit so that at least some beamlines other than the first and second beamlines pass through the hub on route to a further destination without being processed by the hub.

9. (currently amended) An apparatus for use in a stored program controlled system comprising a plurality of processing units for interconnecting processing units to provide space division multiplexing over a free space optical beam line, said apparatus comprising:

a transmit probe configured to modulate a message on a first collimated beamline and to transmit said first beam through a volume of said free space beamline;

a receive probe configured to receive a second collimated beamline in said volume of said free space beamline and to demodulate said second collimated beamline to recover said message;

a conduit that encloses the beamlines and transmit and receiver probes, the transmit and receive probes~~An apparatus in accordance with claim 8 wherein said volumes are~~ arranged in a helix around a centerline~~the circumference~~ of said conduit~~beamline~~.

10 - 11. Canceled.

12. (currently amended) An apparatus in accordance with claim 98 wherein each of said processing units includes a movable probe ring to align said transmit and receive probes of a processing unit, said movable probe ring adapted for rotation about the centerline of the conduit substantially in a plane perpendicular to the beamlines.

13. (original) An apparatus in accordance with claim 12 wherein said processing units include an actuator connected to said movable probe ring configured to align said probes to provide control over transmit and receive probe alignment.

14. (original) An apparatus in accordance with claim 12 wherein said actuator includes stepper

motors with lead screws.

15. (original) An apparatus in accordance with claim 12 wherein said actuator comprises servomotors.

16. (original) An apparatus in accordance with claim 12 wherein said actuator comprises a piezoelectric actuator.

17. (original) An apparatus in accordance with claim 12 wherein said actuator comprises manual adjustors.

18. (original) An apparatus in accordance with claim 8 wherein said receive probes include quadrant photodetectors.